PSYCHE.

ON COLEOPTERA FOUND WITH ANTS. FIFTH PAPER.

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From time to time it has been possible to add a few records to those which I have published in the earlier papers of this series, but it has not been practicable to make a systematic effort to work out the myrmecophilous fauna in the neighborhood of my own home. The fragmentary nature of the observations is well realized — but even fragments may be of use to a future monographer.

I. *Formica exsectoides* Forel (name from Rev. P. Jerome Schmitt). A large colony of these ants has constructed a good-sized hillock of cinders by the side of one of the railroad tracks. An examination of this nest, on the second of May, 1896, revealed many specimens of *Hetaerius brunnipennis*, *Batrisus fossicauda*, *Anthicus melancholicus* and one *Monotoma fulvipes*. On April 24, 1898, I examined another hillock (in this case made of earth, with a thin covering of cinders) belonging to the same species. By scraping away the earth to a depth of three or four inches, I got six *Batrisus fossicauda*, which seemed to be in galleries close to the surface of the mound, especially around the edges. Three *Megastilicus formicarius* were also secured in this hill, besides quite a lot of *Anthicus melancholicus*. The Megastilicus is an active insect and loses no time in burying itself when uncovered by the investigator. It most likely belongs to the group of predatory myrmecophiles.

II. *Formica fusca* var. *subsericea* Say. This ant is much affected by Coleopterous insects, as will be seen by reference to earlier papers. A very large nest was examined in March and found to contain quite a number of *Hetaerius brunnipennis*. On the seventeenth of April I looked again and found more of these beetles as well as a lot of *Ptomaphagus parasitus*, part of which were under a log which lay across the top of the mound while others were obtained deep down in the galleries. One *Megastilicus formicarius* was captured near the surface of the hillock, and as I had never before seen this beetle alive I searched carefully for

others but without success. Besides these, and some unidentified Staphylinidae, I found an example of *Thiasophila americana* Fauvel MS. Later visits showed that the Hetaerius could be found as late as the middle of May, and at this time I got *Batrisus fossicauda* (chiefly near edges of the nest) and a few *Anthicus melancholicus*.

III. *Formica nitidiventris* Em. I cannot find that any beetles are recorded from the nest of this ant, and my own observations had, until recently, been without positive result. On the fourth of last May, however, I found *Cremastochilus harrisii*, in the midst of a strong colony, under a piece of board, on grassy land. Records of the hosts of Cremastochilus are much to be desired, so few having been published, in spite of the undoubted status of these beetles as true guests.

IV. *Lasius americanus* Em. This ant frequently makes its home under leaves in the woods, or under loose bark of fallen trees, or of stumps. Since such situations are also favorite haunts of many Scydmaenidae, Pselaphidae, and Staphylinidae, it is often difficult to conjecture the true relationships of the ants to the accompanying beetles. It may not be out of place, however, to record the following captures of Coleoptera with these ants: *Pycnophus rasus*, *Connophron pallidum*, *C. capillosulum* without record of date; *Batrisus frontalis* in nest under bark, April 28, both this and *B. globosus* in the same situation a month later; *Tmesiphorus costalis*, *Batrisus frontalis*, *Rybaxis conjuncta* var. *truncaticornis* from leaves covering a nest, May 29. *Euryporota discreta* occurred on one occasion only. *Myrmobiota crassicornis* is often rather abundant in subcortical nests, and is, undoubtedly, a true guest, as it seems not to be met with elsewhere.

V. *Lasius aphidicola* Walsh. Often lives in immense colonies, under large stones, on wooded hillsides, and quite frequently inhabits rotten logs, in moist forest lands, these logs being perforated in all directions by galleries. A small nest, investigated on May 31, yielded *Connophron pallidum*. A much larger one, beneath a flat stone, was infested by *Ceophyllus monilis*, of which I took seven specimens. These beetles walked about, carrying themselves high with a "tiptoeing" motion, among the immense swarm of ants, apparently without suffering molestation nor receiving aid from their hosts. On May 8 I had examined a large colony occupying a rotting stump, and took from the galleries three specimens each of *Adranes lecontei*, *Ceophyllus monilis* and *Batrisus globosus*, one *Homoeusa expansa* and sixteen *Tachys ferrugineus*. This Tachys often, if not always, occurs with ants. Mr. Hayward has found it with them, Mr. G. Beyer once sent me several, mounted with Lasius, from New Jersey; and personally I cannot recollect having met with it except in the above mentioned nest. A colony of what I took to be *Lasius aphidicola*, but which Dr. Wasmann identifies as *L. interjectionis* Mayr, at home in an

old stump, was sifted over on May 29, and from it I obtained *Adranes lecontei*, *Ceophyllus monilis* and *Limulodes paradoxus*.

VI. *Tapinoma sessile* Say. This species is very common near Iowa City, but seems but very little favored by guests. I have a record of *Connophron longipenne* taken with it, April 17, but the occurrence is probably accidental.

VII. *Ponera pennsylvanica* Buck. Frequently met with, but I have only a single record. *Connophron clavicorne*, found with this ant, April 17.

VIII. *Aphaenogaster aquia* Buck. Nests in the ground, the galleries opening in the protection of a stone or piece of wood, the latter often much pierced by the tunnels. During April and May, *Limulodes paradoxus* occurs abundantly with this species, and the little beetles may be seen running around among their hosts without any molestation whatever.

IX. *Pogonomyrmex opaciceps* Mayr. Specimens of this ant were sent me from the neighborhood of Denver, Colorado, by Mr. Ernest J. Oslar, who writes that it is the host of *Cremastochilus saucius* and *C. knochii*, specimens of which I have also received from him. He finds the beetles with their hosts at various times, my examples of *saucius* being dated E. Denver, April 10, Berkeley, June 3, and Salida, July 11. The *knochii* are marked Berkeley, April 8, and Chimney Gulch, June 18. He says of *saucius*: "I generally find it in ant hills but never more than one in each, at all times of the year. Last winter, just before Christmas, a friend and myself drove to a place called Parkers, twenty-five miles south of Denver, on a three days' jack rabbit hunt, while a foot of snow lay on the ground. I kicked up four *saucius* from the ant hills during the three days of our hunting. Of course they were dormant, and I carried them in an empty cartridge shell. By the time I got back to Denver they were all lively from the warmth of my pocket." I notice that it is difficult to get perfect specimens of this beetle, the legs often being much mutilated, supposedly by the ants which are large and fierce creatures.

X. *Pheidole vinlandica* Forel, (name from Rev. P. Jerome Schmitt). From a nest of this species I got a single specimen of *Atinus monilicornis*. The colony was housed under a large stone, by the roadside, in the vicinity of Nashville, Tennessee. The date was about the middle of August.

XI. *Cremastogaster clinelata* Say. Although this is one of our commonest Iowa ants and occurs in great colonies, I seldom find any beetles with it except such as are clearly casual companions. I have, however, a record of *Pycnophus rasus* which may be worth saving.

All of the foregoing notes are to be considered as referring to observations made near Iowa city, unless otherwise stated. I wish to express my thanks to Mr. Theo. Pergande and to Rev. P. Jerome Schmitt for kind aid rendered in the way of identifications.